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ABSTRACT

Various studies have been conducted to inductively locate the aspects of occupation in one generation which are transmitted to the next generation as found in corresponding aspects of their labor force aspirations and entry levels. This study restricted attention to intergenerational covariation in components of roles rather than to the structural or interpersonal mechanisms which might explain transmission. Occupations were conceptualized and measured on the basis of indicators for role requirements, content, and rewards. (The author states that role transmission presumes covariation between the requisites, routines, and rewards of parental occupations and the corresponding components of offspring aspirations and eventual labor force occupations.) Data were collected from a national sample of male members of the civilian labor force and from a sample of Michigan high school males. Canonical correlation analysis was used as a multivariate strategy for partitioning the covariance between two sets of scores into orthogonal pairs of linear combinations (dimensions). Canonical correlation analyses for two role relationships, involving parent occupation, early career occupation and late adolescent occupational aspirations, show that (1) role transmission occurs for a multiplicity of occupational characteristics which span requirements, content, and rewards of roles; (2) that the two role relationships are not isomorphic in their structure; (3) that there is support for recent arguments that complexity of roles is a key organizing feature of role transmission processes; and (4) that there is mixed support for recent research on patterns of intergenerational occupational movement. (Author/BM)

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OCCUPATIONS, ROLE CHARACTERISTICS AND INTERGENERATIONAL TRANSMISSION

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ABSTRACT

This paper examines the intergenerational covariation in detailed aspects of occupational roles. Occupations are conceptualized and measured on the basis of indicators for role requirements, content, and rewards. The detailed components are thought to underlie overall role characterizations such as socioeconomic status transmission.

Data pertain to a national sample of male members of the civilian labor force and to a countywide sample of high school males. Canonical correlation analyses for two role relationships, involving parent occupation, early career occupation and late adolescent occupational aspirations, show: (1) role transmission occurs for a multiplicity of occupational characteristics which span the requirements, content and rewards of roles; (2) the two role relationships are not isomorphic in their structure; (3) support for recent arguments that complexity of roles is a key organizing feature of role transmission processes; (4) mixed support for recent research on patterns of intergenerational occupational movement.

Students of stratification--from Marx and Weber through Warner, Svalastoga and Duncan--have been concerned with inequalities in positional rank between generations. Davis and Moore (1945) and Duncan (1968) referred to the persistence of, recruitment to, and the allocation of rewards for social positions or roles. The larger portion of research on attainment processes takes individuals as the unit of analysis in studying the generational transmission of inequalities (Blau and Duncan, 1967; Jencks, et al 1972; Sewell and Hauser, 1975).

The unit of analysis for these theoretical approaches is the rank or location of roles or individuals. Occupation as a performed social role is a "molecular" subcomponent of individual or positional rank. It is usually treated as the best single indicator of class or overall economic position. One of the important consequences of this stance has been to focus most of the attention on overall characteristic aspects of occupational roles (socioeconomic, prestige, manual-nonmanual). While these approaches have been fruitful, the question remains: what is it about occupations that constitutes intergenerational role transmission.

Where others have taken occupation, particularly in its socioeconomic sense, as a molecular component of a larger positional rank, this research takes occupation as the molar phenomenon and investigates its molecular subcomponents. Under an organizing conceptualization of occupation, the analyses below inductively locate the aspects of occupation in one generation which are transmitted to the next generation as found in corresponding aspects of their labor force aspirations and entry levels. The implications for current research that are addressed include (a) attempting to reproduce Mortimer's (1974) findings on patterns of intergenerational occupational movement; (b) providing new empirical evidence on the

disaggregated components of "socioeconomic" transmission; and (c) offering an initial assessment of the argument that cognitive complexity underlies the socioeconomic achievement process. This paper restricts attention to intergenerational covariation in components of roles rather than to the structural or interpersonal mechanisms which might explain transmission.

THEMES FROM CURRENT RESEARCH

Several studies have shown that the major dimension underlying intergenerational occupational movement is "socioeconomic." Blau and Duncan (1967:67-75) reached this conclusion in performing a smallest-space analysis of matrices of mobility in-flow and out-flow between fathers and sons. The primary dimension provided for an ordering of occupation groups which closely approximated the relative earnings and education levels of the groups. Klatzky and Hodge (1971) and Featherman, Jones and Hauser (1975) have reaffirmed this conclusion.

Mortimer (1974) has provided one of the few examinations of "other" axes of intergenerational occupational movement. She hypothesizes that three aspects of father's work are the source of values which are transmitted to sons and reflected in their occupational aspirations: (a) the extent of work autonomy; (b) the characteristic rewards of the occupation; and (c) the functional foci or predominant functions of work activities. To examine this hypothesis, the detailed occupations of fathers along with their sons' detailed career choices were examined in a smallest-space analysis. A two-dimensional solution was taken as a good fit (see Mortimer, Figure 1, 1974:1288).

In the smallest-space array, one of the axes was labelled "bureaucratic-entrepreneurial" and the other was left unlabelled. Instead,

a dashed-line--oblique to the orthogonal axes--was imposed on the space. Occupational groups falling on one side of this inserted axis were labelled as being in a region of "intrinsic rewards" while the remainder of the groups fell in the "extrinsic rewards" region. To interpret the dimensions Mortimer used occupation-related variables such as autonomy, money, security, and helping people versus work with data or things (Mortimer, 1974:1290).[1]

Two points should be noted. First, one of the dimensions that was used to order the occupational groups was left uninterpreted. Rather, Mortimer drew upon one orthogonal axis and the oblique "intrinsic-extrinsic reward" axis as a basis for interpretations. Second, several of the "occupational categories" are not homogeneous occupational categories but class-of-worker or industry categories with a common functional foci (e.g., "self-employed business who work with people"). Given these categories, along with the ambiguities in the interpretation of dimensions, it is not clear whether the reported attributes of work roles are the ones which come into play in structuring father-son interaction. A more precise test of the hypothesis would utilize a more detailed occupational classification system, examine additional work role attributes, and utilize a sample having greater variation in father's occupations and son's career choices. It might also examine sons' labor force entry occupations to see if the same patterns of the transmission govern actual role movements (compared to career choices).

A third relevant theme in the literature suggests that <u>complexity</u>, both internal (cognitive) and external (substantive) to self, is a central aspect of certain role processes. This includes the way "status" is intergenerationally transmitted (Spaeth, 1976; Gaertner, 1977), the ways

that roles structure individual and interpersonal processes and capabilities (Coser, 1975), and the ways occupational activity affects individual psychological functioning, orientations, and values (Kohn, 1969; Kohn and Schooler, 1973; 1978). For example, Spaeth (1976:128) argues:

> . . .parents' exposure to complex environmental settings increases their ability to cope with complexity. This aids the cognitive socialization of their children by increasing parental skills and adding to the parental stock of knowledge and other resources. . . . according to the view advanced here, status is transferred through transmission of the capacity to cope with cognitive complexity. This capacity is, in effect, an intergenerational medium of exchange. By focusing attention on what is transmitted, the complexity gains considerable interpretive advantages compared to the statuses themselves.

Thus for Spaeth, the currency of "socioeconomic" intergenerational transmission is in the capacity to cope with cognitive complexity.

To summarize: there is reason to believe that the fundamental hierarchical dimension underlying occupational roles across generations is a socioeconomic one (Hauser and Featherman, 1977:3-50), yet the detailed characteristics of roles that might constitute the dimension are not well understood. In one of the few attempts to expand this understanding (Mortimer, 1974) several additional work role attributes were hypothesized to underlie role transmission but less than complete confidence could be placed in the findings. Finally, there are several arguments that point to the complexity of roles as a source of characteristics that might define intergenerational transmission.

AN ORGANIZING CONCEPTION AND MEASURES FOR OCCUPATION

It is convenient to think of occupations as social roles (Reiss, et al, 1961; Duncan, 1968; Duncan, Featherman and Duncan, 1972; Hall, 1975). Behavior in a role presupposes recruitment or allocation to the role and having met the requirements for entry. Occupational role requirements can

be defined as those factors, formal or informal, de facto or de jure, that determine access to the occupation. Requirements here are most similar to what Duncan (1968) terms the "principal bases of allocation" for the recruitment of personnel to roles in a division of labor.

A second partition of roles refers to the enactment of the content of the role (the nature of the work, how it is done, and under what conditions). Role content refers to those variable features of activities and routines that are characteristic of occupations. An example of a classification system for routines and activities is the Dictionary of Occupational Titles (1965).

A final organizing feature of occupational roles, sanctions, refer to those rewards and punishments accruing to the incumbent as a function of: (a) merely residing in the role (e.g., the median earnings of physicians relative to elementary school teachers); and (b) the fulfillment or non-fulfillment of expectations with respect to performance in the occupation. The various rewards to role incumbents are often organized in terms of their "intrinsic" and "extrinsic" qualities (Herzberg, Mausner, and Snyderman, 1959; Kohn, 1969; Kalleberg, 1977).[2]

Role transmission presumes covariation between the requisites, routines, and rewards of parental occupations and the corresponding components of offspring aspirations and eventual labor force occupations.

Several criteria were considered in selecting indicators for the role concepts, including their importance in previous research, attempts to span the ranges of requirements, content, and rewards, and choosing indicators which could be generated readily for detailed occupation classification systems. Drawing from existing research (Temme, 1975; Kohn and Schooler,

1973; Bielby and Kalleberg, 1975; Mortimer, 1974) the following variables were chosen as indicators for the role dimensions:

	REQUIREMENTS	SOURCE
1.	educational attainment	(published--U.S. Census)
2.	specific vocational preparation	(Temme, 1975)
3.	racial composition	(published--U.S. Census)
4.	sex composition	(published--U.S. Census)
	ROUTINES	
5.	functional foci (a) data and (b) people and (c) things	(Temme, 1975)
6.	substantive complexity	(Temme, 1975)
7.	routinization	(see below)
8.	closeness of supervision	(see below)
9.	uncertainties	(see below)
	REWARDS	
10.	earnings	(published--U.S. Census)
11.	employment security	(published--U.S. Census)

The general design of the research included developing a matrix of scores composed of 1960 and 1970 three-digit census occupations scored on each of the eleven indicators. After occupations of interest (father's, offspring aspirations, and early career) were coded in census categories for data sources, the appropriate vectors of scores were merged with the individual data records for substantive analyses. The measurement ideal would be to ascertain the indicator information directly from individuals with regard to their particular jobs. In the absence of such information, these scores allow a pragmatic beginning with a level of precision comparable to previous research (Mortimer, 1974; Temme, 1975; Hauser and Featherman, 1977).

For the indicators based on published Bureau of Census sources the following information was generated for each of the 295, 1960 and 595, 1970

categories (U.S. Bureau of the Census, 1973:PC(2)-7A; 1963: PC(2)-7A): sex specific median education and race composition as years of education and percent white, sex composition as percent male, sex-specific median earnings in hundreds of dollars, and sex-specific employment level (Temme, 1975:168) as the percent of those in the occupation who work 50-52 weeks of the year.

The remaining measures draw upon the Dictionary of Occupational Titles (1965). Others have made efforts to use some of the DOT variables, but with two exceptions (Temme, 1975; Lucas, 1972) have either: (a) aggregated occupations into a set of categories less detailed than the Census system (ranging from 17 to 221 categories; Bluestone, 1974; Eckaus, 1964; Scoville, 1966); or (b) generated unweighted averages for occupation categories (Berg, 1970; Barker, 1969; Broom et al, 1977). The measurement ideal is to preserve maximum category detail while minimizing within-category variation on criterion variables. Since the DOT uses a different functional classification system than the census codes, the desired scores should be estimated by a weighted average (some census occupation categories may include several hundred DOT jobs). Procedures departing from this ideal, either in number of categories or weighting of estimates, introduce increasing amounts of within-category variation into the analysis.

Temme (1975) has recently used this procedure in providing estimates for specific vocational preparation, functional foci (data, people, things), and the overall substantive complexity of work, for detailed 1960 and 1970 census categories using the April 1971 Current Population Survey. Further details of the estimation procedure can be found in Temme (1975:166-243).

The data, people, and things variables are based on the premise that every job requires a worker to function in some level of complexity in relation to these three primitives. The eight-point scales found in the DOT are used here (see the DOT, Vol. II, 1965:649; Spenner, 1977:65-74; Temme, 1975). Specific Vocational Preparation (SVP) is defined as the amount of training time required to perform at an average level in a specific job-worker situation.[3] Finally, drawing on Kohn's (1969) ideas and data, Temme (1975:214-227) estimated an index of occupational self-direction. Since this measure is dominated by a substantive complexity of work subscale (r = .927) it will be taken as an indicator of such. The estimates were generated through a regression-prediction procedure, and the scale values range from -3 to 26.

The choice of indicators for role routinization, closeness of supervision, and uncertainties, draws upon the work of Kohn (1969:153-160; also see Kohn and Schooler, 1973; 1977). Kohn finds levels of routinization and closeness of supervision to be two key aspects of work, along with its substantive complexity, that circumscribe the overall levels of autonomy in occupations.

The procedure used in developing estimates for these variables is similar to the mapping and weighting techniques described by Temme (1975) and Lucas (1972).[4] Each of the dichotomously scored DOT items, when weighted and mapped into detailed census categories, is represented by a score ranging from 0 to 1. The two indicators for routinization and the two indicators for closeness of supervision were reflected (such that high numeric values represented freedom from routinization and close supervision respectively) and combined in an unweighted sum for each of the two variables. Other analyses (Spenner, 1977:106-126) indicate that this scaling

does not seriously distort underlying relationships for this substantive problem.[5]

DATA AND METHODS

To index the relationship between father's occupation and respondent's early career occupation, the 1973 Occupational Changes in a Generation (OCG) data were used (Featherman and Hauser, 1975). They represent a probability sample (n = 33,500) of male members of the civilian non-institutional population. The appropriate occupation variable scores were merged to individual data records for father's occupation when the respondent was about 16 and for respondent's first full-time occupation after the completion of schooling. First occupation was used because it is contiguous in the life course to the career choice variable used by Mortimer. Analyses not reported here (Spenner, 1977) show that first occupation maximizes intergenerational covariation in the occupational variables compared to current occupation. Dimensionalizations of the covariation between father's occupation and respondent's current occupation show generally similar, but slightly weaker patterns compared to first occupation.

Data for the father's occupation-son's career choice relationship pertain to all 17-year-old males enrolled in high schools in Lenawee County, Michigan, in 1957 (Haller and Miller, 1971). Of the 442 respondents, 261 reported their father's occupation and articulated a realistic occupational aspiration in sufficient detail to permit coding in 1960 three-digit occupation categories and the merge of occupational role characteristic measures.

Canonical correlation analysis (Timm, 1975:347-358) is used as a multivariate strategy for partitioning the covariance between two sets of

scores into orthogonal pairs of linear combinations (dimensions). This procedure offers comparability with other research on this topic (Blau and Duncan, 1967; Klatzky and Hodge, 1971; Featherman, Jones, and Hauser, 1975).[6]

RESULTS

The means, standard deviations, and intergenerational zero-order correlations of occupation variables for father's occupation, respondent's occupational aspirations and early career occupation are reported in Table 1. The OCG scores are based on 595 census occupation-industry categories while the Lenawee County scores are based on the 295, 1960 census occupation categories.

To assess the underlying axes between the two sets of role characteristics across generations for each of the role relationships canonical correlation analysis was used. Ordinarily, the canonical weights would be used to describe the net extent to which each variable contributes to the make-up of each linear covariate. But among the set of occupation variables there are substantial colinearities (Spenner, 1977:470-471) rendering the interpretation of the canonical weights questionable. Since the actual values of the canonical variates are unaffected by this problem, the correlations of each variable with the respective variate were constructed and are provided in Table 2. The coefficients measure the total association between variable and variate, including "direct effect" and the input a variable has to the linear combination as a function of its association with other variables in the set. Substantive significance will be attributed to a variable if it holds more than 15 or 20 percent of its variance

in common with a variate (r = .4) which far exceeds statistical significance for these samples.

In considering the father's occupation-son's early career occupation relationship, several features of the coefficients in Table 2 corroborate existing research while others extend it. First, as implied in Duncan's scale (1961) and reproduced a number of times since its conception using more aggregated analyses (Blau and Duncan, 1967; Klatzky and Hodge, 1971; Featherman, Jones and Hauser, 1975), "education" and "income," generically speaking, provide the fundamental ingredients of the major axis for transmission. Seventy percent of the variance in father's occupation-specific median eduction and 72 percent for median income is held in common with father's first canonical variate while for son's first variate the common variance is 75 percent for median education and 72.6 percent for median income. Inasmuch as stratification research includes these components, it cannot be faulted by the molecular outcomes reported here.

The first canonical dimension is also defined by the content of work. For father, three additional variables have a nontrivial portion of their variance in common with the first variate: substantive complexity of work (43.6%), degree of involvement with people (48.9%), and involvement with things (35.9%). The first variate for son's also draws on the same variables (substantive complexity of work--65.4%; involvement with people--37.3%; but only marginally upon involvement with things--15.4%) and additionally upon involvement with data (52.3%), specific vocational preparation (33.6%), and freedom from close supervision (21.3%). If this first dimension is taken as a fundamentally "socioeconomic" then these results corroborate existing research in the importance at...buted to occupation-specific education and earnings. They extend previous research in

empirically demonstrating that other characteristics of occupations, particularly certain features of the content of work, are also important in referencing the same basic dimension.

A second major feature in the upper panel of Table 2 shows the second variate for both fathers and sons referenced largely by variables which can be thought of as indexing the substantive and cognitive complexity of work content (for both fathers and sons, level of involvement with data, overall substantive complexity of work, freedom from close supervision, and freedom from routinization). This pattern is more pronounced for fathers than for sons. As with the first pair of variates, it is roughly the case that the components of father's occupation that define transmission are the same ones that sons experience as a function of transmission.

It might be argued that the first dimension refers to status transmission while the second dimension references a different type of non-status role transmission. In this respect, these findings corroborate and extend our knowledge on the constitution of status transmission, and provide some initial evidence on the constitution of a second "non-status" dimension, that largely references a transmission of the content of work. On the other hand, it might be argued that both pairs of variates are different manifestations of a singular socioeconomic transmission. One obtains an "artificial" orthogonalization of the two dimensions with canonical correlation analysis. Resolution of these interpretations requires the estimation of more complex models, beyond the scope of this paper. Nonetheless, these results permit statements about the relative importance of role characteristics in intergenerational transmission irrespective of how the reference dimensions stand theoretically in relation to one another.

The corresponding correlations for the father's occupation-son's occupational aspiration relationship can be found in the lower panel of Table 2. Compared to the father's occupation-son's early career occupation relationship there are some similarities in the first dimension but few in the second pair of variates. Median education and median earnings most strongly define the transmission of components from father's occupation to son's aspirations (for father: median education, 47.2%; median earnings, 55.7%; and for son: median education, 45.4%; median earnings, 59.6%). Similar to OCG sons, other features of work roles also index the first dimension, including involvement with people and things, substantive complexity of work and race composition. On the other hand, the second canonical dimension in father's occupation-son's occupational aspiration relationship is only minimally referenced by the role characteristics measured here.

The main line of correspondence between the two intergenerational role relationships is the first dimension--in the prominence of occupation-specific earnings and education as definers of transmission and additionally, in the general importance of other role characteristics indexing the content of work. Hence, there is some reason to believe the two role relationships may be governed by a very similar primary dimension both in its size and constitution. On the other hand, there is no indication of similar types of role transmission for the second pairs of variates. This suggests the features of roles relevant in describing intergenerational transmission to aspirations are only in part important in the same ways and to the same extent as they are in intergenerational transmission to actual labor force activity.

These results support arguments that cognitive complexity of environments is one of the major dimensions underlying the socioeconomic achievement process (Spaeth, 1976). A precise test of Spaeth's hypotheses would require measures of the capacity to cope with cognitive complexity as well as the complexity of (work) environments for parents and offspring. These data include the latter kinds of measures for occupation, but not the former. Nonetheless, the findings unambiguously show a transmission of complex occupational environments: a number of components of roles in one generation, which are closely related to the complexity of environments (levels of involvement with data and things, substantive complexity of work, freedom from close supervision and routinization, and race composition of the occupation) are traceable to some of the same components of occupational roles in the previous generation.[7]

Perhaps a stronger statement, one that modifies and extends Spaeth's hypotheses is in order. Spaeth (1976) conceptualizes complexity as a variable aspect of environment that is highly colinear and overshadowed by the socioeconomic status of the occupation. If one believes that only the first dimension is "socioeconomic," then these findings provide firm reason to believe that hierarchical components of complexity are an intricate part of the socioeconomic transmission along the first axis. Moreover, other aspects of roles, "complexity" of work in other senses of the term, appear to be transmitted through the second orthogonal axis. On the other hand, if it is believed that both the first and second dimensions constitute "socioeconomic" status transmission, then even greater support is offered for the complexity thesis as the second dimension is primarily defined by characteristics indicating the content complexity of roles (see Kohn and Schooler, 1978). Yet these results are somewhat at variance with Spaeth's

heavy emphasis on cognitive complexity, compared to an emphasis on complexity as a multi-faceted construct, having cognitive and non-cognitive manifestations.

Finally, how well do these outcomes reproduce Mortimer's (1974) findings? The sample differences preclude precise comparisons. Her Michigan sample has restricted socioeconomic origins for fathers, uses a college male population and assesses career choices when the respondents were college seniors. The OCG and Lenawee County data have much greater variation in occupations, and assess aspirations when the respondents were high school seniors.

If Mortimer's findings are characteristic of the covariance in role relationships across generations then the occupation variables underlying her reported dimensions should play a major role in referencing the canonical variates. The variables for levels of involvement with data, people and things circumscribe her discussion of the functional foci of work. To deduce which variables might reference the bureaucratic-entrepreneurial distinction measures of association between the role variables for father's occupation (OCG) and a dummy variable for father's class-of-worker (salaried-government employee versus self-employed) were examined. Only three (level of involvement with data, freedom from close supervision, and freedom from routinization) hold even a modest association with this variable (i.e., $r = .40-.52$). The "intrinsic-extrinsic" rewards axis used by Mortimer should minimally encompass the role characteristics of median earnings, employment security and possibly substantive complexity of work. This set of variables (listed in Table 3) should be important in role transmission in order to corroborate Mortimer's (1974) findings.

Since canonical variates are ambiguous if compared to Mortimer's dimensions (due to the oblique reward axis that was used), a more liberal criterion was adopted: the sum total of common variance between an occupation variable and the first three canonical variates for father or son. Table 3 provides a summary of predicted and obtained outcomes.

For the aspiration relationship, five of the variables important in Mortimer's scheme in fact play that role in varying degrees (levels of involvement with people and things, median earnings, substantive complexity, and employment security). Important though, the three occupation variables that most closely reference a bureaucratic-entrepreneurial distinction have little of their variance in common with the first three canonical variates. This is the case for father and for son. Additionally, median education (along with specific vocational preparation, race composition, and uncertainty if son's job activity is considered)--not mentioned in Mortimer's discussion, although perhaps implicit in her mention of social status--are important role in referencing intergenerational occupational movement. These findings question the efficacy of the "bureaucratic-entrepreneurial" distinction and the wisdom of excluding role requirements (median education). As one moves to a larger population the picture of covariation across generations changes. Thus, our studies concur in the importance of rewards and certain of the content variables as they form a basis for father-son interaction. Our studies disagree on the importance of other work characteristics in intergenerational role transmission.

For son's actual labor force activity in relation to father's occupation, a different set of conclusions is appropriate. With the possible exception of involvement with things, the variables discussed by Mortimer

all have modest to high portions of their variance in common with the first three variates for both father and son. This is not to endorse the "bureaucratic-entrepreneurial distinction" for the disaggregated components are likely more informative. In contrast to Mortimer's interpretation, the different requisite features of occupational roles bear modest to high importance in defining transmission.[8]

DISCUSSION

It was suggested that occupational roles should be disaggregated into their constituent components to elucidate certain role processes. Overall aggregate or "molar" characterizations, while fruitful depictions of general features of roles such as their desirability-resources (socioeconomic status) or work focus (manual-nonmanual) for certain types of research questions, leave unclear how detailed components of roles come into play.

Several conclusions are supported. First, transmission between father's occupation and son's early career occupation, when cast in a statistical frame of linear orthogonal combinations, appears as a multiplicity of role characteristics in two dimensions. The first closely reproduces "socioeconomic" status transmission in its size and makeup, and spans the requisite, content, and reward features of roles. A second dimension, socioeconomic or otherwise depending on one's theoretical predilection, depicts another line of transmission centering around work role content, particularly its complexity. Second, an alternate role relationship (aspirations) shows only partial isomorphism to the former. Third, these outcomes support recent arguments about the complexity of roles and environments as organizing features of role processes (Spaeth, 1976) but

modify them in pointing out the varigated nature of the complexity concept. Finally, mixed support is shown for recent related research by Mortimer (1974). Certain features of roles delineated there are reproduced in their importance. On the other hand, the wisdom of excluding other features (role requisites) is questionable, as is the fruitfulness of the "bureaucratic-entrepreneurial" distinction.

Several questions both note the limitations of this research and portend a future agenda. What constitutes sufficient detail and inclusiveness of role characteristics? Most studies, like this one, use more ad hoc than theoretically motivated decision rules. Which non-orthogonal dimensionalization best describes the organization of occupational roles? Estimation is in progress with more flexible multivariate procedures yet it perhaps only begs the larger task: the need for comprehensive theoretical statements about the molecular social organization of occupational roles.

NOTES

[1] This distinction is not clear in Mortimer's work; nor is it obvious how the "third axis" was superimposed on the two-dimensional array. For example, professors and teachers are placed in the group that works with people, falling outside of the group which works with "people and the communication of ideas" (see Mortimer, Figure 1, 1974:1288).

[2] For related conceptual schemes of occupations, see Temme (1975), Bielby and Kalleberg (1975), and Reiss, et al. (1961).

[3] This includes vocational education, apprenticeship training, in-plant training, on-the-job training, as well as essential experience in other jobs. The SVP estimates range from 1 (short demonstration only) to 9 (over 10 years).

[4] The specific indicators were taken from the DOT "temperament" variables (1965; Volume II, 649-656). For routinization they were:

> 1. Situations involving a variety of duties often characterized by frequent change.
>
> 2. Situations involving repetitive or short-cycle operations carried out according to set procedures or sequences.

For closeness of supervision the indicators were:

> 3. Situations involving doing things only under specific instruction, allowing little or no room for independent action or judgment in working out job problems.
>
> 4. Situations involving the direction, control, and planning of an entire activity or the activity of others.

Finally, the indicator for uncertainty was:

> 8. Situations involving performing adequately under stress when confronted with the critical or unexpected or when taking risks.

[5] While Temme used the October 1966 CPS in a fashion analogous to the April 1971 CPS to generate estimates for the 1960 census categories, the former body of data was not available for generating estimates for routinization, closeness of supervision, and role uncertainty. To arrive at the estimates for 1960 categories, the 1970 estimates were mapped through the transformation matrix found in the Bureau of the Census Technical Paper 26, where 1970 occupation-industry categories are expressed in terms of their 1960 occupation-industry elements (U.S. Bureau of the Census, 1972; see Hauser and Featherman, 1977:60, for use of this procedure with SEI and prestige scores).

[6] A potentially more informative multivariate procedure for dimensionalizing occupations within each generation and then estimating cross generation covariation would estimate: (a) measurement models for the component dimensions of occupation within each generation allowing the constructs to be

correlated rather than orthogonal; and (b) cross generational effects through structural equation models. Due to its expanded scope along with several substantial conceptual and estimation problems (see Spenner, 1977: 281-332) this effort is relegated to another paper.

[7] In other analyses not reported here, the DOT item, general educational development (GED), which indexes the overall levels of cognitive complexity required for an average performance in an occupation (the relative levels of mathematical, reasoning, and verbal development) was included in the canonical analyses. When GED is included in the father's occupation-son's early career occupation analysis, its common variance with the second variate is 45.4 percent for fathers and 24.4 percent for sons. The percentages for the first pair of variates are lower and throughout there are only minor modifications in the relative importance of other variables. This lends some additional credence to Spaeth's argument regarding cognitive and substantive complexity of environments as a transmission dimension. This variable was not reported in the major analyses because of possible measurement problems (see Duncan, Featherman, and Duncan, 1972:69-79).

[8] Race, gender, and age cohort differences in the role transmission relationships will be made in another set of comparisons. It is appropriate to note here that the patterns of transmission for black male offspring in relation to their fathers appear quite similar to those reported here for the total population of males. Role transmission for female offspring, considered in relation to father's or mother's occupations, appears to vary quite markedly from that for males.

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TABLE 1: Means, Standard Deviations and Intergenerational Correlations of Occupation Variables for Father's Occupation, Respondent's Occupational Aspiration and Respondent's Early Career Occupation.

	MEANS AND STANDARD DEVIATIONS								INTERGENERATIONAL ZERO-ORDER CORRELATIONS	
	Father's Occupation				R's Occupational Aspiration		R's Early Career Occupation		Father-R's:	
	OCG[a]		LNCO[a]		LNCO		OCG		Aspiration LNCO	Early Occupation OCG
VARIABLE	$\bar{x}$	s.d.	$\bar{x}$	s.d.	$\bar{x}$	s.d.	$\bar{x}$	s.d.		
Male Median Education	11.57 (10.41)[c]	1.86 (2.16)	10.84	1.97	12.79	3.09	11.93 (10.93)	2.20 (2.49)	.316	.374
Sex Composition	83.18 (84.56)	22.92 (21.64)	85.25	16.09	90.48	14.33	78.05 (79.61)	23.51 (22.54)	.090	.076
Male Race Composition	90.67 (90.69)	8.99 (9.49)	93.98	4.82	95.41	4.22	89.09 (89.00)	7.69 (9.52)	.114	.221
Specific Vocational Preparation	5.56	1.64	5.84	1.52	6.81	1.11	4.85	1.75	.041	.186
Involvement with Data[b]	3.65	2.23	3.27	2.20	1.78	1.36	4.44	2.24	.075	.218
Involvement with People	7.04	1.64	6.85	1.65	6.77	2.15	7.05	1.70	.153	.250
Involvement with Things	4.24	2.61	4.11	2.55	3.83	3.02	5.07	2.40	.245	.194
Substantive Complexity	8.94	6.22	9.87	6.52	13.36	5.27	7.70	6.88	.185	.332
Freedom from Close Supervision	1.11	.59	1.25	.56	1.40	.43	.85	.51	.033	.175
Freedom from Routinization	1.29	.63	1.26	.58	1.56	.40	1.05	.63	.067	.190
Uncertainty	.27	.44	.47	.17	.16	.37	.29	.45	.039	.119
Male Median Earnings	71.12 (43.99)	31.43 (19.90)	50.07	16.27	58.49	25.30	68.24 (43.89)	34.38 (20.05)	.370	.349
Male Employment Security	74.12 (70.76)	13.90 (18.03)	75.69	14.53	78.83	15.06	67.62 (63.97)	15.11 (17.08)	-.037	.157

NOTES: [a] OCG = Occupational Changes in a Generation data, LNCO = Lenawee County data; n's: OCG = 21,000 (weighted n; adjusts cases to allow use of simple random sample statistical formulae), LNCO = 261;

[b] for the Data, People and Things variables, a high score indicates a low level of involvement;

[c] OCG 1960-based (census occupation code) scores are listed below the corresponding 1970 figure; all LNCO scores are based in the 1960 categories.

TABLE 2: Correlations between Occupation Variables and Canonical Variates for Father's Occupation-Respondent's Aspiration and Father's Occupation-Respondent's Early Career Occupation Relationships.

VARIABLE	Canonical Variate: Father 1	Father 2	Father 3	Son 1	Son 2	Son 3
Father's Occupation-Son's Early Career Occupation (OCG)[b]						
Male Median Education	.843	.386	.063	.866	.339	-.003
Sex Composition	-.204	.077	.164	-.141	-.134	.241
Male Race Composition	.251	.725	.077	.497	.648	-.063
Specific Vocational Preparation	.235	.591	.303	.509	.454	.313
Involvement with Data[a]	.292	.789	.192	.681	.504	.214
Involvement with People[a]	.697	.184	.214	.611	.232	.182
Involvement with Things	.599	-.138	.055	.392	-.045	-.055
Substantive Complexity	.672	.594	.255	.810	.458	.200
Freedom from Close Supervision	.055	.818	.197	.463	.621	.235
Freedom from Routinization	-.261	.625	.504	-.071	.731	.532
Uncertainty	-.089	-.485	.497	-.212	-.326	.570
Male Median Earnings	.851	.055	.118	.852	.001	.134
Male Employment Security	.207	.696	-.379	.412	.391	-.329
Father's Occupation-Son's Occupational Aspiration (LNCO)[c]						
Male Median Education	.687	.505	.281	.674	.259	.002
Sex Composition	-.130	-.176	-.063	.045	-.455	-.130
Male Race Composition	.417	.084	.055	.525	-.032	.032
Specific Vocational Preparation	-.055	.310	.032	.089	.235	.205
Involvement with Data[a]	.089	.300	.207	.148	.255	.155
Involvement with People[a]	.490	.190	-.243	.473	.126	.077
Involvement with Things	.651	.032	-.084	.506	-.105	.105
Substantive Complexity	.414	.336	.063	.558	.134	.126
Freedom from Close Supervision	-.089	.224	.002	-.237	.110	.274
Freedom from Routinization	-.228	.336	-.089	-.173	.326	-.032
Uncertainty	.145	-.045	-.055	.179	.100	.187
Male Median Earnings	.746	.187	-.134	.772	.170	-.268
Male Employment Security	.063	.032	.179	-.110	-.265	-.527

[a] Signs of the coefficents are reflected such that large scale values indicate higher levels of involvement with data and people.

[b] The first three canonical correlations are respectively: .447, .267, .163; for all three $p < .001$.

[c] The first three canonical correlations are respectively: .542, .385, .363; $p < .01$ for the first two and $p < .05$ for the third.

TABLE 3: Summary of Common Variance between Occupation Variables and Variates in Relation to Mortimer's Study.

VARIABLE	Prediction of Importance from Mortimer's Interpretation	Proportion of Common Variance with Variates[a]			
		Father's Occupation-Son's Aspiration		Father's Occupation-Son's Early Career Occupation	
		Father	Son	Father	Son
Involvement with Data	yes	.141	.111	.745	.764
Involvement with People	yes	.335	.246	.565	.460
Involvement with Things	yes	.432	.321	.381	.159
Male Median Earnings	yes	.609	.697	.741	.744
Male Employment Security	yes	.037	.360	.671	.431
Freedom from Close Supervision	yes	.058	.143	.711	.655
Freedom from Routinization	yes	.173	.137	.713	.822
Substantive Complexity	yes	.288	.345	.869	.906
Specific Vocational Preparation	no	.100	.105	.496	.563
Male Median Education	no	.806	.521	.864	.865
Sex Composition	no	.052	.226	.074	.096
Male Race Composition	no	.184	.278	.595	.671
Uncertainty	no	.026	.077	.490	.476

[a] The proportion (or "redundancy index") refers to the sum of squared correlations for each variable across the first three canonical variates (see Stewart and Love (1968) or Timm (1975:354-357)). See Table 1 for data sources and N's.